

issued



by the

SMITHSONIAN INSTITUTION
U. S. NATIONAL MUSEUM

Vol. 86

Washington : 1938

No. 3042

DESCRIPTIONS OF NEW AND LITTLE-KNOWN FOSSIL
LIZARDS FROM NORTH AMERICA

By CHARLES W. GILMORE

SINCE the appearance of my memoir entitled "Fossil Lizards of North America"¹ in 1928, the United States National Museum has acquired, either through purchase or from its various paleontological expeditions, a number of fossil lizard specimens. Some of these contribute to a better understanding of forms already known, while others are here described as new. The type of *Rhineura sternbergii* Walker is illustrated for the first time. All the illustrations have been made by Sydney Prentice.

Family AMPHISBAENIDAE

Genus RHINEURA Cope

The genus *Rhineura* as applied to extinct forms now includes the three species *R. hatcherii* Baur, *R. coloradoensis* Cope, and *R. sternbergii* Walker. A fourth species, *R. minutus*, is described below. All are from the Oligocene, *R. coloradoensis* being from the Chadron, the others from the Brule.

¹ Gilmore, Charles W., Mem. Nat. Acad. Sci., vol. 22, 1928.

RHINEURA MINUTUS, new species

FIGURE 1

Type.—U. S. N. M. no. 12158, consisting of the skull, lower jaws, 23 articulated vertebrae, and a few incomplete ribs. Collected by M. V. Walker, 1931.

Type locality.—A small badland area that is bisected by U. S. Highway No. 20, about 8 miles east of Douglas, Converse County, Wyo.

Horizon.—Lower nodular layer of the Brule, Oligocene.

Description.—The type specimen was found weathered out on the surface of a nodule. The skull of this specimen appears to be the smallest reptilian cranium that has yet been found in North America, measuring only 7.8 mm in length. It is thus slightly shorter than the type skull of *Rhineura sternbergii* (see fig. 2) and also is less robust in its other proportions. Both of these specimens were found at the same locality, and the small size of the National Museum individual led me at first to regard it as pertaining to *R. sternbergii*. Through the courtesy of George F. Sternberg, who loaned me the type, I was able to make direct comparisons of the two skulls, and differences were found that indicate that they pertain to distinct species.

From *R. sternbergii* the skull of *R. minutus* is distinguished by the less steeply arched profile, the absence of a distinct sagittal ridge, the absence of roughening on the frontal and parietal surfaces, narrower occipital region, slenderer maxillary, shorter precoronoidal part of jaw, and longer postcoronoidal part. All these differences are clearly seen by a comparison of figures 1 and 2.

From *R. hatcherii* Baur, known from the Brule formation of South Dakota and Nebraska, *R. minutus* is at once distinguished by its much smaller size, being about one-half the dimensions of the known skulls of that species. Furthermore, those characters enumerated above that distinguished it from *R. sternbergii* also serve to differentiate *R. minutus* from *R. hatcherii*.

The absence of a sagittal ridge on the parietal and supraoccipital and the lack of roughening of the frontal and parietal surfaces might suggest the juvenile character of the individual, if it were not for the fact that most of the skull sutures are so thoroughly coössified as to defy detection. It is concluded, therefore, that the type specimen is fully adult.

In profile the upper border is evenly rounded from front to back, differing in this respect from all known species of *Rhineura* both living and extinct that have the facial and occipital angles much more steeply inclined. This depression of the skull brings about a

narrowing of the maxillary as compared with *R. sternbergii*, approaching *R. hatcherii* more nearly in this respect.

Viewed from above (see fig. 1, B) the skull is more regularly elongate, with a relatively narrower occipital region than in any of the other known species. The paired frontals are deeply emarginate at the center, but their superior surfaces are perfectly smooth, not roughened as in *R. hatcherii* and *R. sternbergii*. The anterior parietal surface is flattened and gradually slopes off on either side, instead of being angular as in the other species. There is no trace of a median sagittal ridge more posteriorly, the surface rounding over evenly from side to side. There is faint indication of the sutural contact with the supraoccipital as shown in figure 1, B. None of the other sutures of the occipital region can be differentiated.

The nose is slightly incomplete, as the thin part of the nasal bones forming the covering for the nares is eaten away, and in figure 1 it has been restored after Carnegie Museum specimen no. 423A. Unfortunately, only a few of the sutures separating the individual elements can be distinguished.

Since the premaxillary is complete only at the center, its lateral extent cannot be certainly determined. On the ventral surface it bears a single tooth (see fig. 1, C), as in the other species. Its posterior extent between the nasals is not certainly determined as shown in the illustrations.

The maxillary carries six small, sharply pointed teeth. It is triangular in outline, relatively narrower and slenderer in front than the maxillary of *R. sternbergii*. A row of small foramina extends along the lower edge parallel with the alveolar border. About midway of the length of the maxillary the three anterior teeth are separated by a considerable space from the posterior three. This same arrangement prevails in *R. sternbergii* but not in specimens of *R. hatcherii*.

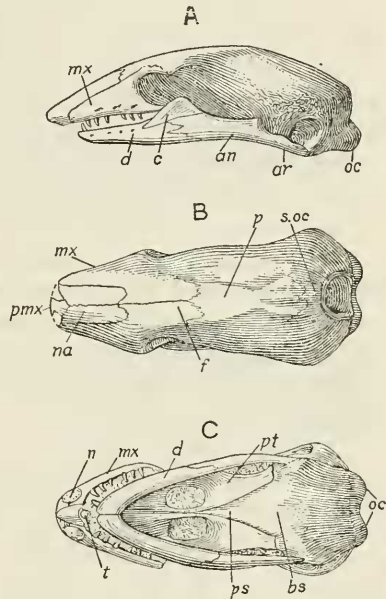


FIGURE 1.—Skull of *Rhineura minutus*, new species, type (U.S.N.M. no. 12158): A, Lateral view; B, dorsal view; C, ventral view. *an*, angular; *ar*, articular; *bs*, basisphenoid; *o*, coronoid; *d*, dentary; *f*, frontal; *mx*, maxillary; *n*, external nares; *na*, nasal; *oc*, occipital condyle; *p*, parietal; *pmx*, premaxillary; *ps*, presphenoid; *pt*, pterygoid; *s.oc*, supraoccipital; *t*, premaxillary tooth. Five times natural size.

The nasals are as in *R. sternbergii* but relatively shorter.

The frontals are differentiated only by the median and posterior sutures. The posterior median line is less deeply indented by the parietals than in *R. sternbergii*.

The posterior extent of the parietal and its union with the supra-occipital are faintly indicated as shown in figure 1, B. This surface shows no indication of a sagittal ridge, which forms such a prominent feature of the other species.

In the palatal view none of the sutures can be determined; the upward pitch of the basisphenoid and parasphenoid surfaces is less pronounced than in *R. sternbergii*. The posterior limits of the large scalelike pterygoids can be clearly determined as shown in figure 1, C. Their junction with the palatines, however, is fully coalesced and cannot be determined. The anterior palatal region is hidden by the articulated lower jaws and is therefore not available for study.

Lower jaws.—The lower jaws remained in an articulated state, but only the dentary and coronoid sutures show clearly, all others being fused. Compared with the ramus of *R. sternbergii*, the jaw is slenderer and the coronoid has a more anterior position, thereby making the postcoronoidal part of the ramus considerably longer. The number of teeth in the lower jaw cannot be determined from this specimen.

TABLE 1.—Comparative measurements of skulls of *Rhineura*

Measurement	<i>R. minutus</i> U.S.N.M. no. 12158 (type)	<i>R. sternbergii</i> (type)	<i>R. hatcherii</i> P. M. no. 11309 (type)
	Mm	Mm	Mm
Greatest length at center.....	7.8	8.0	13.5
Greatest width across squamosals.....	3.3	4.0	5.7
Greatest width across orbits.....	2.9	3.0	4.0
Least width of brain case.....	1.6	1.75	3.2
Length of lower jaw.....	5.0	4.1	8.75
Space occupied by upper teeth.....	2.0	2.0	3.3

Vertebrae.—There are 23 articulated vertebrae preserved with this specimen. The anterior end of the series was in contact with the skull. The first two vertebrae, however, are damaged, and they cannot be positively identified as being the atlas and axis. In fact, the absence of hypapophyses indicates that a few vertebrae may be missing from the anterior end of the series. Except for their very much smaller size, I am unable to detect any features that would distinguish these vertebrae from those of *R. hatcherii* which I have previously described.² The series has a greatest length of 31 mm.

² Mem. Nat. Acad. Sci., vol. 22, p. 43, 1928.

RHINEURA STERNBERGII Walker

FIGURE 2

Rhineura sternbergii WALKER, Trans. Kansas Acad. Sci., vol. 35, p. 225, 1932.

This species was established by M. V. Walker on a beautifully preserved skull and lower jaws, with the sutures plainly discernible; thus most of the skull elements can be fully differentiated.

Walker gave a most complete and thorough description of the type specimen, but without illustrations. Through the courtesy of George F. Sternberg, in whose private collection the specimen belongs, I am now enabled to present for the first time two views (fig. 2) of this interesting specimen.

This species was distinguished from *R. hatcherii* as follows: "Viewed from the side, the skull of *Rhineura sternbergii* differs from *R. hatcherii* in being proportionately longer in the facial angle, and proportionately shorter in the occipital angle. In other words, the slightly rounded ascending facial angle of *R. sternbergii* continues to a point considerably posterior of the point at which it turns and descends in *R. hatcherii*. The skull thus appears more highly arched, proportionately, than in *R. hatcherii* * * *. The nasals are proportionately much longer in *Rhi-*

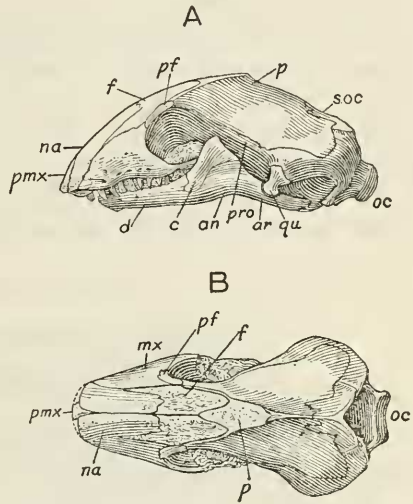


FIGURE 2.—Skull and lower jaws of *Rhineura sternbergii* Walker, type: A, Lateral view; B, dorsal view. *an*, angular; *ar*, articular; *c*, coronoid; *d*, dentary; *f*, frontal; *mx*, maxillary; *na*, nasal; *oc*, occipital condyle; *p*, parietal; *pf*, prefrontal; *pmx*, premaxillary; *pro*, prootic; *qu*, quadrate; *s.oc*, supraoccipital. Five times natural size.

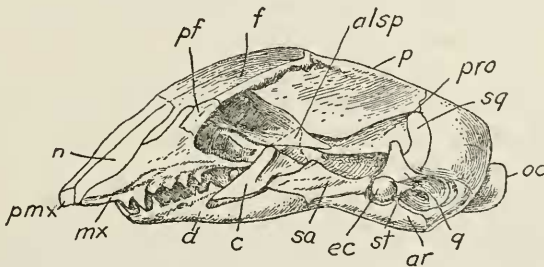


FIGURE 3.—Skull of *Rhineura hatcherii* Baur (Carnegie Museum no. 423A) viewed from the left side. *alsp*, alisphenoid; *ar*, articular; *c*, coronoid; *d*, dentary; *ec*, extra columella; *f*, frontal; *mx*, maxillary; *n*, nasal; *oc*, occipital condyle; *p*, parietal; *pf*, prefrontal; *pmx*, premaxillary; *pro*, prootic; *q*, quadrate; *sa*, surangular; *sq*, squamosal; *st*, stapes. Four times natural size. After Gilmore.

neura sternbergii, and the superior process of the premaxillary extends much farther posteriorly between the nasals. The maxillary is less triangular and more rounded anteriorly. The precoronoidal part of the dentary is shorter than the postcoronoidal portion. Also, the most anterior process of the coronoid terminates slightly behind the last tooth."

When direct comparison of the original skulls of *R. sternbergii* and *R. hatcherii* is made, the supposed difference in the facial and occipital angles of the skulls largely disappears, as may be clearly seen by comparing figures 2 and 3. The steeper premaxillary region in *R. sternbergii* makes the nose of this species much blunter than in *R. hatcherii* and *R. minutus*.

The other characters used by Walker for differentiating *R. sternbergii* are as stated by him and effectually distinguish the species.

Family ANGUIDAE

Genus GLYPTOSAURUS Marsh

GLYPTOSAURUS GIGANTEUS Gilmore

FIGURE 4; PLATE 1

Glyptosaurus giganteus GILMORE, Mem. Nat. Acad. Sci., vol. 22, p. 119, pl. 14, fig. 1, 1928.

The acquisition by the United States National Museum of two well-preserved specimens referable to the little-known *Glyptosaurus giganteus* is of interest in contributing to a better understanding of this species. The type specimen, Carnegie Museum no. 1471, consists of the frontal portion of the skull, covered on its superior surface with osseous dermal scutes. Although this fragmentary specimen displayed minor distinctive characteristics, its large size was the principal distinguishing feature.

The most complete specimen, U.S.N.M. no. 13869, consists of the almost complete skull and lower jaws to which is attached, *in situ*, a considerable portion of the dermal scuta that form the protective armor of the neck and the forward portion of the body (see pl. 1). In this latter respect it is the most complete specimen of a *Glyptosaurus* that has yet been discovered and the first to give an adequate conception of the arrangement of the dermal scuta on the anterior part of the animal.

The second specimen, U.S.N.M. no. 13861, consists of a nearly complete skull with the articulated ramus of the right side. Both of these specimens were collected in 1935 by George F. Sternberg from the Brule formation (Oreodon beds) of the Oligocene, about 8 miles southeast of Douglas, Converse County, Wyo.

Skull.—Both skulls lack their premaxillaries, but otherwise the crania are fairly complete. Since the skulls have much of their outer surfaces covered with tuberculated scuta, there is but little of the structure, aside from the palate, to be observed. The skull of this species is blocklike, broad across the parietals, and gradually narrowing from the back of the orbits forward. In profile there is a sag in the forward parietal region, but from a point above the center of the orbit the superior surface curves regularly downward to the nose. The central part of the frontonasal region of the skull is transversely hollowed out.

The entire external surface of the skull, except for a narrow strip paralleling the dental border of the maxillae, is covered by tuberculated osseous scuta. From a study of both skulls it has been possible to work out the extent and arrangement of nearly the entire scutellation, as shown in figure 4.

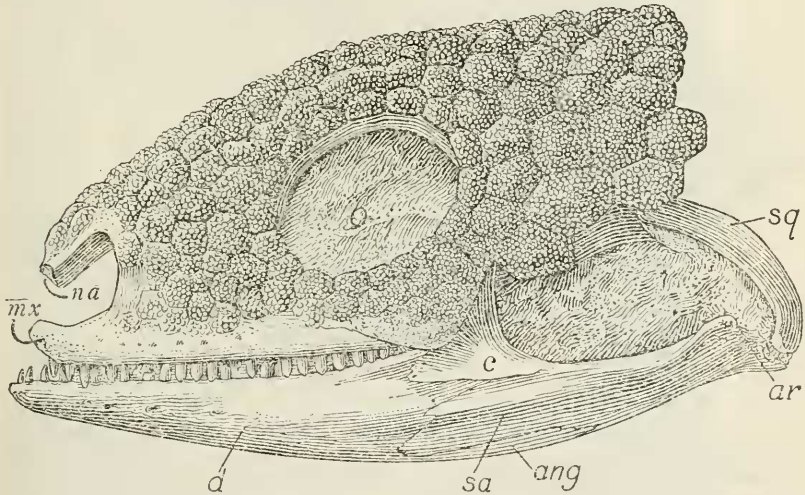


FIGURE 4.—Skull and lower jaw of *Glyptosaurus giganteus* Gilmore: Lateral view of U.S.N.M. no. 13869; scutellation restored from opposite side and from specimen U.S.N.M. no. 13861. *ar*, articular; *ang*, angular; *c*, coronoid; *d*, dentary; *mx*, maxillary; *na*, nasal; *o*, orbit; *sa*, surangular; *sq*, squamosal. Natural size.

Comparison of the scutellation of the top of the two skulls shows considerable variation in the sizes of the scutes, though their general arrangement is much the same in both specimens. Those of U.S.N.M. no. 13861 are the coarser and in that respect approach nearest to the type specimen with which it has been directly compared. On the dorsal side the scutes are arranged in irregular longitudinal rows, becoming more regular in their arrangement above the orbits. In this species the scutes have angularly convex upper surfaces, which

are thickly studded with small tubercles without definite arrangement. On the sides of the skull posterior to the orbit the scutes are arranged in longitudinal rows, and they gradually increase in size from above downward, more especially on the posterior half of the skull. The form of their upper surfaces also changes from the highly convex to nearly flat surfaces with the tubercles arranged in three to four concentric rows around the periphery of the scute, the center being filled with smaller tubercles without definite arrangement. The tubercle pattern is similar to that of the type specimen of *G. ocellatus* Marsh, which is now regarded as a synonym of *G. sylvestris*.³ This specimen thus offers further proof of the correctness of that conclusion.

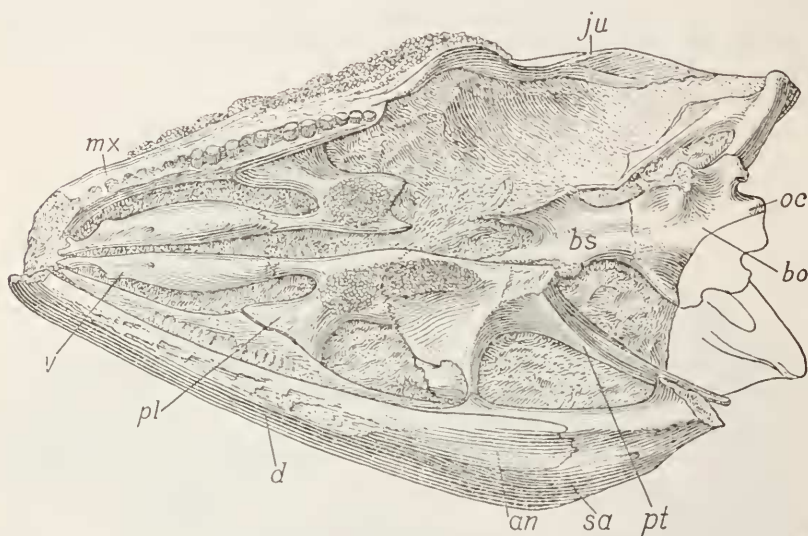


FIGURE 5.—Palatal view of skull and jaw of *Glyptosaurus giganteus* Gilmore: U.S.N.M. no. 13861. *an*, angular; *bo*, basioccipital; *bs*, basisphenoid; *d*, dentary; *ju*, jugal; *mx*, maxillary; *oc*, occipital condyle; *pl*, palatine; *pt*, pterygoid; *sa*, surangular; *v*, vomer. Natural size.

The orbit is encircled by a complete row of 17 or more scutes. Douglass found 20 surrounding the orbit of *G. montanus*. In the top of the right orbit of U.S.N.M. no. 13869 is a row of six scutes that completely covers the projecting edges of the postfrontal, frontal, and prefrontal bones and corresponds in position to the row of five supraorbital plates in *Gerrhonotus* or the lesser number in *Peltosaurus*.

In front of the orbit the scutes grow progressively smaller from above downward and cover all the bone surfaces except a 3-millimeter strip along the lower edge of the maxillary. All known *Glyptosaurus*

³ Mem. Acad. Nat. Sci., vol. 22, p. 99, 1928.



GLYPTOSAURUS GIGANTEUS GILMORE.

First specimen found that shows the dermal armor covering the neck in its natural articulated arrangement. About one-half natural size.

Skull and dermal armor. U. S. N. M. no. 13869.

specimens show this strip to be free of osseous scutes, nor have any been found attached to the lower jaws. There is a tendency for these cranial scutes to fuse with the underlying bones. The fusion or non-fusion of the scutes is probably largely determined by the age of the individual.

Palate.—The palatal region of U.S.N.M. no. 13861 is quite complete, lacking only the left pterygoid and portions of the basioccipital and basisphenoid, and for the first time gives an adequate conception of the palatal structure in the genus *Glyptosaurus* as shown in figure 5.

Most of the occipital condyle and the processes are missing from the basioccipital. It is coossified by a straight transverse suture with the basisphenoid. The basipterygoid gives off two wide divergent processes near its anterior termination for articulation with the pterygoids. These are relatively shorter than in *Peltosaurus*. The pterygoid extends forward and inward from the quadrate with which it was in contact. Forward of its contact with the basisphenoid, the inner border continues straight forward to the palatine. On the inner side of the ventral surface, beginning immediately in advance of the pterygoid-basisphenoid articulation, is an elongated narrow patch of so-called pterygoid teeth. These teeth are tubercular, closely and irregularly crowded together, and collectively resemble the pattern on some of the dermal scutes (see fig. 5).

The palatine bone is short, with a bifurcated anterior end, the outer branch articulating with the inner side of the maxillary, the inner branch with the vomer. Much of the palatal surface is covered by a rounded patch of palatine teeth. These tubercular teeth are similar in form and distribution to those of the pterygoid, differing only in the extent and shape of the aggregation, which is shorter and more rounded than the long narrow patch on the pterygoids. In the presence of patches of toothlike structures on both the pterygoids and palatines *Glyptosaurus* closely resembles *Melanosaurus* of the Wasatch. The presence of patches of tooth structures on both pterygoid and palatine bones shows that I was in error in ascribing all fragmentary parts having tooth patches in *Glyptosaurus* to the pterygoids.⁴ In my figures the rounded shape of the tooth patches shows them to be palatine, not pterygoid, as erroneously designated.

The vomers are separated from one another along the median line except toward their anterior ends. They are elongate, with rounded swollen palatal surfaces. The posterior end is reduced to a slender rod that articulates with the inner anterior branch of the palatine. There is no indication of vomerine teeth, though they are present in the related *Melanosaurus*. They are also absent in *Peltosaurus*.

⁴Mem. Nat. Acad. Sci., vol. 22, pl. 15, figs. 4, 8; pl. 19, fig. 10, 1923.

Lower jaws.—The sutures in the three rami under consideration are clearly determinable, but the arrangement and extent of the separate elements show no characteristics that would in any way distinguish them from the other species of the genus. Since the structure of the ramus in *Glyptosaurus* has been quite fully described⁵ it is unnecessary here to enter into further details.

TABLE 2.—Measurements of skulls and jaws of *Glyptosaurus giganteus*

Measurement	U.S.N.M. no. 13861	U.S.N.M. no. 13869
<i>Skulls</i>		
	<i>Mm</i>	<i>Mm</i>
Greatest length of skull, about.....	128	-----
Greatest width of skull, across parietal.....	54	58
Greatest width of skull, between orbital borders.....	34.5	36
Greatest height of skull.....	41.5	-----
Greatest height of skull with mandible.....	58	60
Anteroposterior diameter of orbit.....	24	24
Vertical diameter of orbit.....	20.5	19
<i>Jaws</i>		
Greatest length of ramus, about.....	112	108
Depth of ramus at posterior end of tooth row.....	15	14
Depth of ramus at anterior end of tooth row.....	-----	6
Depth of ramus posterior to coronoid.....	12	11
Transverse width middle of tooth series.....	9.5	11.5
Transverse width between coronoid and cotylus.....	15	3
Greatest transverse diameter across articulated rami.....	-----	56

Dermal scutes.—The osseous dermal scutes of *Glyptosaurus* that surround the neck and anterior part of the body are beautifully preserved in U.S.N.M. no. 13869 (see pl. 1). These are arranged in transverse and longitudinal rows, parts of 15 transverse rows being present in this specimen and little disturbed from their normal placement. The transverse rows of rectangular scutes immediately posterior to the skull cover the dorsal surface, the right side, and the region under the throat. More posteriorly, however, the scutes are missing on the ventral surface, as are most of those on the left side. With the exception of the scutes forming the median dorsal row, the others are nearly all rectangular in shape. The first two rows posterior to the skull are about as long as wide, whereas those that follow are nearly twice as long as wide. The scutes are closely joined by their lateral edges, and their ends are imbricated, the extent of the imbrication indicated by a smooth transverse band across their anterior ends. In the few scutes where the anterior end is exposed this smooth band is very narrow, measuring about one-sixth the total length of the scute. It is quite evident that this overlap is much

⁵ Mem. Nat. Acad. Sci., vol. 22, pp. 110, 111, 1928.

greater in other parts of the animal, since scattered scutes found with other specimens show this smooth band to be one-fourth the total length of the scute.

The exposed surfaces of all the scutes are thickly studded with rounded tubercles. Those on the margins are usually arranged in two or more concentric rows. The tubercles inside these outer rows are usually smaller and without definite arrangement, except that there is a tendency in some scutes to form subcircular rows around the low nodelike carina that occurs on the posterior dorsal surface. Except on the median dorsal row the carina is always placed nearer to the inner than to the outer side of the scute. This fact would enable one to segregate scattered scutes into the right and left series.

The ventral scutes have the same rectangular shape, but they are distinguished from those described above by their smaller size, absence of a carina, and less prominently developed tubercles without definite arrangement. Since the anteriormost rows of the ventral scutes preserved cover the posterior end of the ramus, it seems quite probable that in life they continued farther forward under the jaws.

The scutes of the median dorsal row differ from the others in being wedge-shaped, wider in front than behind, and the low nodelike carina centrally placed on the posterior half. Slight disarrangement renders the count a little uncertain, but there appear to be 14 longitudinal rows of scutes, enumerating from the median dorsal row to the midventral region. This would indicate the complete circumference as being composed of 29 longitudinal rows of plates at a point immediately posterior to the skull.

With the discovery of more and better-preserved specimens, it becomes more and more apparent that in the genus *Glyptosaurus* the tubercular patterns on the scutes are of little assistance in taxonomy. Such differences as have been used in the past are found to be valueless from the fact that this ornamentation varies with the position of the scute on the body. Therefore until their limitations are known they will be of little use in characterizing species.

The cranial scutes, on the other hand, appear to show definite differences, although, as indicated by the two specimens now before me, there is considerable individual variation that must be always taken into consideration.

Genus PELTOSAURUS Cope

PELTOSAURUS species

In 1928 I referred⁶ three incomplete dentaries from the Fort Union, Paleocene of Montana, to the genus *Peltosaurus*, but without

⁶ Mem. Nat. Acad. Sci., vol. 22, p. 137, 1928.

specific designation. A fourth specimen, U.S.N.M. no. 10920, consisting of an incomplete left maxillary containing a few teeth, has now turned up in the collections. This specimen was also collected by A. C. Silberling in 1908, in Sec. 4, T. 5 N., R. 16 E., Sweetgrass County, Mont. In size and in all other particulars, insofar as they can be compared, this maxillary and teeth are in full accord with those of *Peltosaurus granulatus*, with which they have been directly contrasted. In view of their much earlier geological occurrence, I am loath to assign them to the Oligocene species, as in all probability more complete specimens would show their specific distinctness. For the present, therefore, I shall continue to regard these specimens as specifically undeterminable.

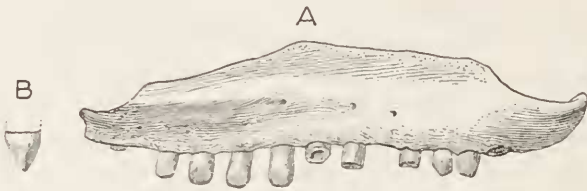


FIGURE 6.—Right maxillary of *Xestops piercei*, new species, type (U.S.N.M. no. 13807): A, Lateral view; B, posterior view of tooth. Five times natural size.

Genus XESTOPS Cope

XESTOPS PIERCEI, new species

FIGURES 6, 7

Type.—U.S.N.M. no. 13807, consisting of both maxillae, anterior ends of both dentaries with numerous upper and lower teeth, and many dermal scutes. Collected by George B. Pierce, 1935.

Locality.—About 6 miles north of Tuttle Ranch, Elk Creek, Big Horn Basin, Big Horn County, Wyo.

Horizon.—Graybull formation, Wasatch, Eocene.

Description.—All the bones comprising the type specimen were found cemented together in a compact mass by the iron-stone covering so commonly found adhering to Wasatch fossils. It is quite evident that originally the entire skull had been present, as the maxillae and dentaries are little disturbed from their normal relationships, the whole top of the skull having been eroded away.

The right maxillary is complete in length, but the left one lacks a small portion of its anterior end. The right maxillary has the usual triangular outline, being deeply emarginated toward the upper anterior end and thus forming much of the lower and posterior borders of the external narial opening. The external surface of the bone is smooth, with only slight indication of the former presence of osteo-

derms, which probably covered much of the surface, as in the related *Glyptosaurus*, *Melanosaurus*, and *Peltosaurus*. This bone is perforated by the usual row of foramina.

The precise number of teeth in the maxillary cannot be determined from this specimen. There is evidence of 13, but at least 3 more would be required to fill the space hidden by the overlapping of the dentary upon the anterior alveolar border. The teeth are pleurodont, robust, and extend well below the parapet of the maxillary. The apices are bluntly wedged-shaped, with the cutting edge running longitudinal. The outer beveled surface is much shorter than the inner slope. Anterior and posterior sides of the teeth are flattened and closely placed in the series (see fig. 6). In a 10-millimeter space there are 12 teeth, whereas in *Melanosaurus maximus*, also from the Wasatch, $4\frac{1}{2}$ teeth occupy an equal space. The related *Peltosaurus* is intermediate in this respect, having 8 teeth in a 10-millimeter space. The crowns are parallel-wrinkled, usually at right angles to the cutting edge. The right maxillary has a greatest length of 14.3 mm. Except that the maxillary teeth become smaller at the ends of the series, all seem to be very similar.



FIGURE 7.—Two dermal scutes of *Xestops piercei*: Type (U.S.N.M. no. 13807). Five times natural size.

The few anterior teeth of the dentary that are present appear slenderer and extend relatively higher about the parapet than in the maxillary series.

The few dermal scutes found with this specimen are keelless, but it may be that all these pertain to the underparts of the skull and neck, and these are usually without carinae. With the exception of the narrow smooth band on the anterior end, for the overlap of the next adjoining scute, the dorsal surfaces are sculptured by a series of pits sparsely placed and without regular arrangement, as shown in figure 7.

One of the scutes has a beveled lateral edge, a condition previously observed⁷ only in the genus *Xestops*. The presence of this type of scutellation and close resemblances of the dentition to that of *Xestops vagans* strongly suggest that the affinities of this new species lie in the genus *Xestops*, to which it is now provisionally referred.

⁷ Mem. Nat. Acad. Sci., vol. 22, p. 145, 1928.

The presence of dermal scuta and pleurodont teeth, closely set with swollen obtuse summits, indicates the affinities of *Xestops piercei* to lie in the family Anguillidae.

From *Xestops vagans* this species is distinguished by its much smaller size and by the pitted character of the dermal scutes. The other species of the genus are all based on inadequate specimens and all are doubtfully referred, and in all probability they pertain to other genera. Their retention in *Xestops* has simply been a matter of expediency, and contrasting the present specimen with them would be of little significance.

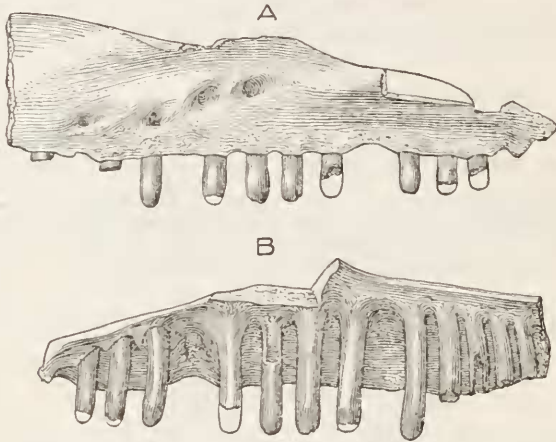


FIGURE 8.—Left maxillary of ? *Harpagosaurus silberlingii*, new species, type (U.S.N.M. no. 13877): A, External view; B, internal view. Five times natural size.

SAURIA OF UNKNOWN FAMILY REFERENCE

Genus HARPAGOSAURUS Gilmore

? HARPAGOSAURUS SILBERLINGII, new species

FIGURE 8

Type.—U.S.N.M. no. 13877, consisting of the greater portion of a left maxillary containing whole or parts of 12 teeth. Collected by A. C. Silberling, 1908.

Type locality.—Sec. 4, T, 5 N., R. 16 E., Sweetgrass County, Mont.

Horizon.—Fort Union No. 2, Paleocene.

Description.—The type maxillary lacks a portion of its anterior end, and only 5 of the 12 teeth have their complete crowns preserved as shown in figure 8.

The teeth, of which there is evidence of 14 in all, are pleurodont, with long shafts, rounded on the internal side but flattened on both